

New records of *Haematomma* and *Ophioparma* from China

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ABSTRACT—*Haematomma caperaticum* and *Ophioparma rubricosa* are newly reported from China, and *H. africanum* and *H. wattii* are reported for the first time from mainland China.

KEY WORDS—East Asia, *Haematommataceae*, lichenized fungi, *Ophioparmaceae*, taxonomy

Introduction

Haematomma A. Massal. was described by Massalongo in 1852. It is usually recognized by lecanorine apothecia with a bright red to orange-red epihymenium; *Lecanora*-type or *Haematomma*-type asci; colourless, fusiform to broadly acicular, transversely multiseptate ascospores; and the presence of atranorin (Brodo & al. 2008, Nelsen & al. 2006, Nash & al. 2004, Smith & al. 2009). This genus is common in the world's temperate and tropical regions (McCarthy & Mallett 2004). *Ophioparma* Norman resembles *Haematomma* in its red to orange-red discs but differs in its secondary chemistry—*Haematomma* produces haematommone or russulone, (K+ purple or K+ red) while *Ophioparma* produces haemoventosin (K+ blue) (Smith & al. 2009).

Molecular analyses have clearly supported placement of *Ophioparma* in *Ophioparmaceae* (Wedin & al. 2005). However, the position of *Haematomma* is still debated, with some authors placing it in *Lecanoraceae*, others in *Haematommataceae* (Brodo & al. 2008, McCarthy & Mallett 2004); the use of molecular methods by Kalb & al. (2008) and Lumbsch & al. (2008) have thus far failed to resolve this problem.

Here we describe Chinese material representing four species of *Haematomma* and *Ophioparma*, two new to China and the other two new to mainland China.

Materials & methods

The studied specimens are housed in the Lichen Section of the Botanical Herbarium, Shandong Normal University, Jinan, China (SDNU). Their morphological characters were examined under an OLYMPUS SZ51 stereomicroscope and an OLYMPUS CX21 polarizing microscope. Both thallus and medulla were identified by testing with K (a 10% aqueous solution of potassium hydroxide) and C (a saturated solution of aqueous sodium hypochlorite). The lichen substances were identified using standardized thin layer chromatography techniques (TLC) with system C (Orange & al. 2010). The lichens were photographed using the SZX16 and BX61 microscopes attached to an OLYMPUS DP72 digital camera.

Taxonomic descriptions

Haematomma africanum (J. Steiner) C.W. Dodge,

Beih. Nova Hedwigia 38: 39 (1971)

FIG. 1A–E

Corticolous. Thallus crustose, continuous, rugose or rimose, roughened, without isidia or soredia, dull yellowish white, medulla I–; prothallus usually present. Apothecia rounded, deep reddish, sessile or constricted at base, dispersed, smooth, (0.5–)0.8–1.4 mm diam., margin distinct, crenulate or flexuose, usually prominent with disc; epihymenium red to orange-red, K+ purple, dissipating; hymenium hyaline, 50–75 µm tall; hypothecium hyaline, K–; paraphyses branched and anastomosing. Asci clavate, 8-spored; ascospores persistently colorless, strongly twisted in ascus, multi-septate, fusiform, curved, 21–24-celled in optical view, locules sometimes not equal in size, 50–75 × 5–7.5 µm. Pycnidia: not observed.

CHEMISTRY—Cortex and medulla K+ yellow, C–, KC–. Atranorin, placodiolic acid, and haematommone detected by TLC.

SPECIMENS EXAMINED: CHINA. FUJIAN, Wuyishan, Tongmucun, alt. 1200 m, on bark, 26 Oct. 2010, X.R. Kou 20104860, 20104861 (SDNU). GUIZHOU, Kaili, Mt. Leigong, alt. 1800 m, on bark, 2 Apr. 2011, Y.L. Cheng 20112194 (SDNU).

DISTRIBUTION—Central and South America, southern Africa, Australia, China (Taiwan), Costa Rica, India, Hawaii, Malaya, Japan, Philippines, and Papua New Guinea (Staiger & Kalb 1995, Aptroot & Sparrius 2003, Nelsen & al. 2006, Brodo & al. 2008). New to mainland China.

COMMENTS—The Chinese material has ascospores with slightly more septa than previously cited for *H. africanum* (10–20-celled; Staiger & al. 1995) but otherwise agrees in morphology and chemistry.

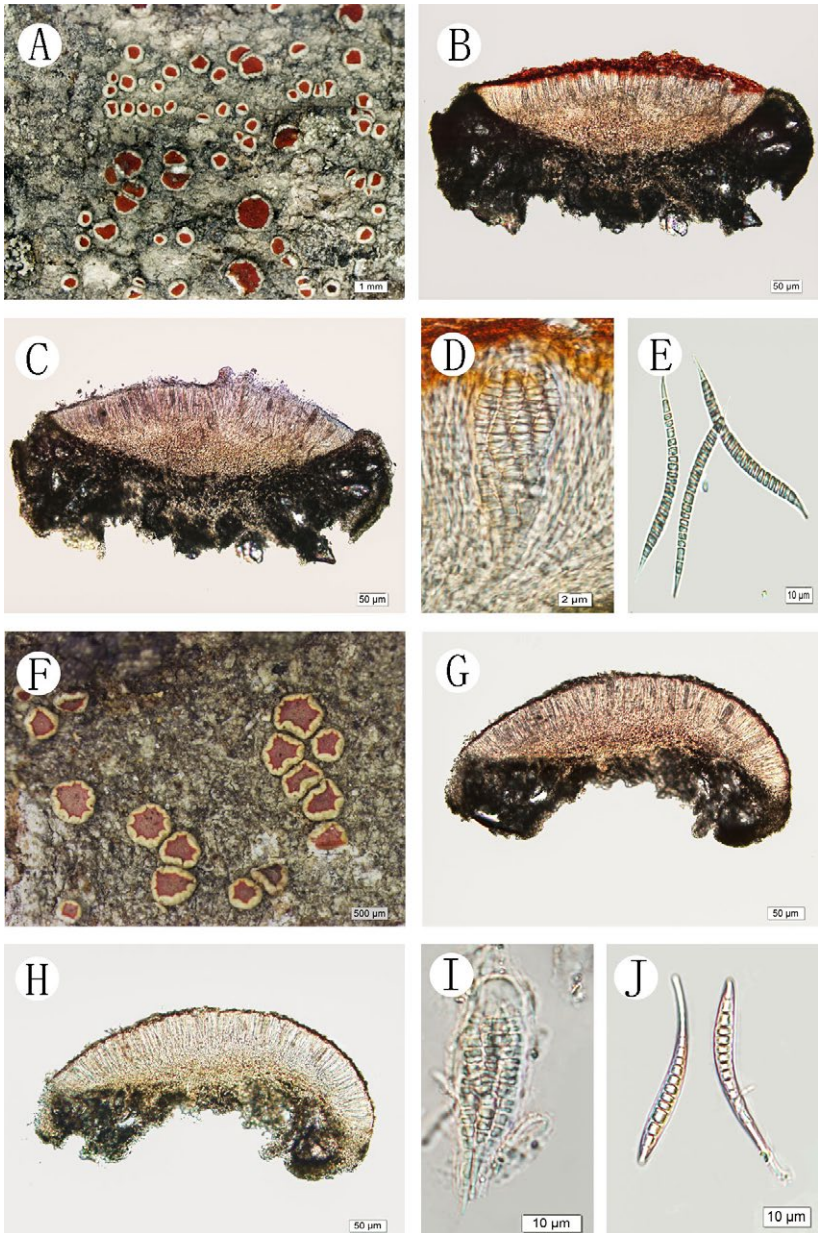


FIG. 1. *Haematomma africanum*. A. Thallus; B. Apothecium section; C. K reaction; D. Ascus; E. Ascospores. *Haematomma caperaticum*. F. Thallus; G. Apothecium section; H. K reaction; I. Ascus; J. Ascospores.

Haematomma africanum morphologically resembles *H. accolens* (Stirt.) Hillmann and they share a common chemistry, but *H. accolens* has smaller ($42\text{--}62 \times 3\text{--}5\text{ }\mu\text{m}$) spores with fewer (6–8) cells (Brodo & al. 2008). Additionally, *H. accolens* usually has a thinner, more regular, apothecial margin.

Haematomma caperaticum Brodo, W.L. Culb. & C.F. Culb.,
Bryologist 111(3): 388 (2008)

FIG. 1F–J

Corticulous. Thallus crustose, continuous, rugose or rimose, roughened, without isidia or soredia, dull yellowish white; prothallus not observed. Apothecia rounded, deep reddish, sessile or constricted at base, dispersed, smooth, yellowish pruinose, 0.5–0.8 mm diam., margin distinct, inward flexuose, usually prominent with disk; epihymenium red to orange-red, K+ purple, dissipating; hymenium hyaline, 50–62.5 μm tall; hypothecium hyaline or pale yellowish, K–; paraphyses branched and anastomosing, 2–2.5 μm diam. Asci clavate, 8-spored; ascospores persistently colorless, multi-septate, fusiform, curved, 8–15-celled in optical view, locules sometimes not equal in size, $62.5\text{--}75\text{--}(77.5) \times 3\text{--}5\text{ }\mu\text{m}$. Pycnidia: not observed.

CHEMISTRY—Cortex and medulla K+ yellow, C–, KC–. Atranorin, placodiolic acid (minor), haematommone (minor), and caperatic acid detected by TLC.

SPECIMEN EXAMINED: CHINA. GUANGDONG, Xinyi, Dari Top, alt. 1700 m, on bark, 5 Nov. 2010, H.Y. Wang 20107544 (SDNU).

DISTRIBUTION—Haiti, Dominican Republic, Jamaica. and Guatemala (Brodo & al. 2008). New to China.

COMMENTS—The Chinese material closely matches the protologue description of *H. caperaticum* (Brodo & al. 2008). The most diagnostic characteristics of *Haematomma caperaticum* are the yellowish pruinose apothecia and the presence of caperatic acid.

Haematomma wattii (Stirt.) Zahlbr., Cat. Lich. Univers. 5: 776 (1928) FIG. 2A–E

Corticulous. Thallus crustose, continuous, rugose or rimose, roughened, without isidia or soredia, dull yellowish white or pale grey; prothallus usually present. Apothecia rounded, deep reddish, sessile or constricted at base, dispersed, smooth, epruinose, (0.3–)0.8–1.8 mm diam., margin distinct, crenulate or flexuose, usually prominent with disk; epihymenium red to orange-red, K+ purple, dissipating; hymenium hyaline, 75–90 μm tall; hypothecium hyaline or pale yellowish. Asci clavate, 4-spored; ascospores persistently colorless, muriform, fusiform, curved, 18–23-celled in optical

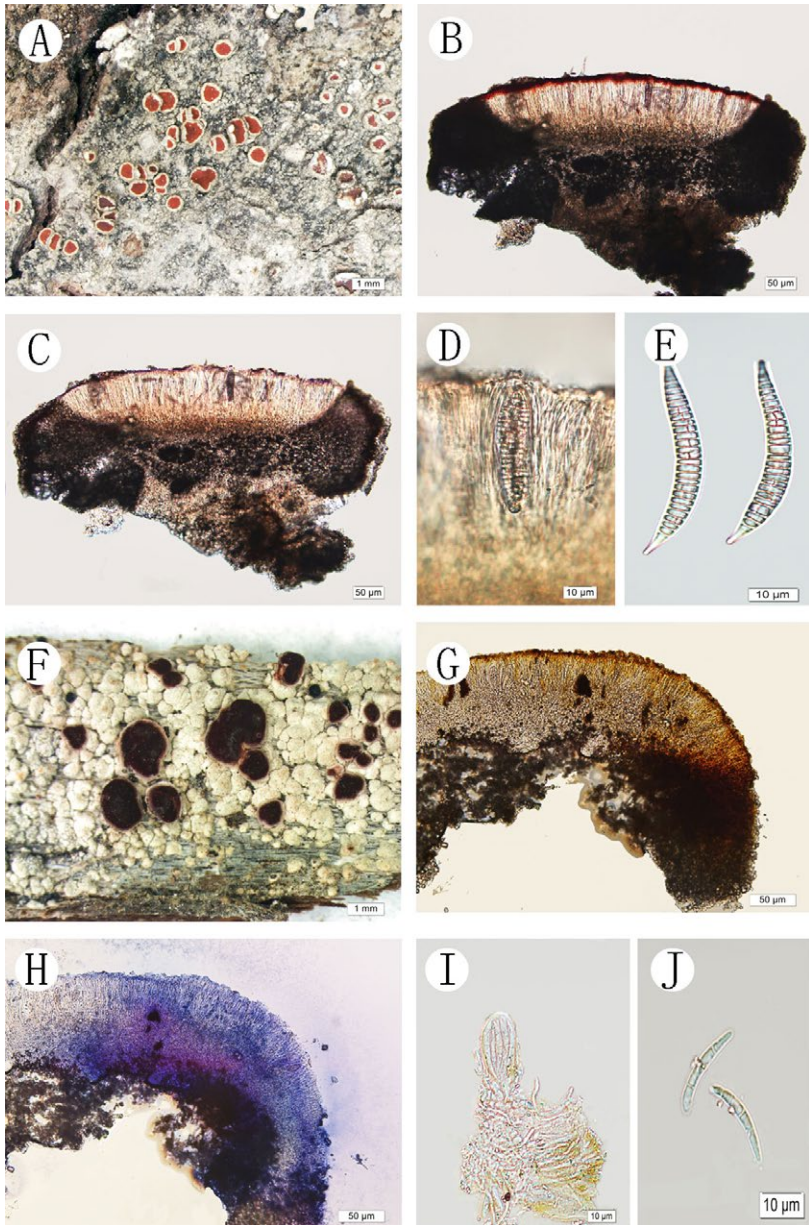


FIG. 2. *Haematomma wattii*. A. Thallus; B. Apothecium section; C. K reaction; D. Ascus; E. Ascospores. *Ophioparma rubricosa*. F. Thallus; G. Apothecium section; H. K reaction; I. Ascus; J. Ascospores.

view, locules sometimes not equal in size, $62.5\text{--}82.5(-100) \times 6.25\text{--}7.5(-10) \mu\text{m}$. Pycnidia: not observed.

CHEMISTRY—Cortex and medulla K⁺ yellow, C⁻, KC⁻. Atranorin, placodiolic acid, and haematommone detected by TLC.

SPECIMENS EXAMINED: CHINA. GUIZHOU, Kaili, Mt. Leigong, alt. 1800 m, on bark, 24 Aug. 2010, Z.L. Huang 20103177, 20103190 (SDNU); 2 Apr. 2011, Y.L. Cheng 20112441, 20112674 (SDNU). JIANGXI, Ji'an, Qianmocun, alt. 1300 m, on bark, 1 Nov. 2010, H.Y. Wang 20106037 (SDNU).

DISTRIBUTION—China (Taiwan), India, Thailand, Borneo, Malaysia, Philippines, and Papua New Guinea (Aptroot & Sparrius 2003, Brodo & al. 2008). New to mainland China.

COMMENTS—The Chinese material closely matches previously published descriptions of *H. wattii* (McCarthy & Mallett 2004). *Haematomma wattii* is chemically similar to *H. africanum*, which differs by its muriform and thicker ascospores (see COMMENTS, above, under *Haematomma africanum*).

Ophioparma rubricosa (Müll. Arg.) S. Ekman,

Opera Bot. 127: 133 (1996)

FIG. 2F–J

Corticulous. Thallus granular, without isidia or soredia, pale yellowish white; prothallus not observed. Apothecia red, dispersed, smooth, epruinose, 0.5–1.5 mm diam., margin thin and disappears in old apothecia; epihymenium orange-red, K⁺ blue; hymenium hyaline, 60–65 μm tall; hypothecium hyaline. Asci clavate, 8-spored; ascospores persistently colorless, multi-septate, fusiform, 3–4-celled in optical view, $30\text{--}42.5 \times 2.5\text{--}3 \mu\text{m}$. Pycnidia: not observed.

CHEMISTRY—Thallus K⁻, C⁻, KC⁻. Divaricatic acid, haemoventosin, usnic acid (minor), and nordivaricatic acid (minor) detected by TLC.

SPECIMEN EXAMINED: CHINA. XIZANG, Linzhi, Lulang, Mt. Sejila, alt. 4400 m, on bark, 27 Oct. 2007, G.Y. Han 20073332 (SDNU).

DISTRIBUTION—U.S.A. and Canada (Martínez & Aragón 2003, Brodo & al. 2001). New to China.

COMMENTS—The Chinese material closely matches previously published descriptions of *O. rubricosa* (Brodo & al. 2001). The most diagnostic character of *Ophioparma rubricosa* is its granular thallus. It is morphologically similar to *Ophioparma araucariae* (Follmann) Kalb & Staiger, which differs by containing thamnolic acid.

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